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ASTRONOMICAL OBSERVATIONS IN 1915.

Made by TORVALD KÖHL, at Odder, Denmark.

VARIABLE STARS.

(The instrument used is a 3-inch Steinheil, power 42.)

*S Ursæ Majoris.*<sup>1</sup>

Jan. 10:	S 2 steps > f'	Sept. 11:	= g.
Feb. 3:	< g.	12:	id.
Feb. 8:	id.	14:	id.
Mar. 22:	= g.	18:	id.
23:	id.	28:	invisible
31:	1 step > f'.	Oct. 3:	id.
Apr. 4:	3 steps < e.	7:	< g.
11:	id.	26:	= g.
Aug. 22:	= f.	Nov. 11:	{in the middle be- tween e and f'
31:	id.	23:	3 steps < e.
Sept. 2:	1 step > g.	25:	id.
5:	= g.	Dec. 4:	2 steps < e.
7:	id.	9:	1 step < e.
9:	id.		

*T Ursæ Majoris.*<sup>2</sup>

Jan. 10:	T 5 steps > a.	Mar. 22:	= f.
Feb. 3:	{in the middle be- tween a and b.	23:	id.
		31:	3 steps < g.

<sup>1</sup> Vide the sketch in the *Publications A. S. P.*, No. 73, 12, 56.

<sup>2</sup> Vide the sketch in the *Publications A. S. P.*, No. 22, 4, 63.

Feb. 8:	= c.	Sept. 14:	1 step > a.
Apr. 4:	4 steps < g.	18:	= a.
11:	very faint.	28:	$\frac{1}{2}$ step > a.
Aug. 22:	3 steps > a.	Oct. 3:	id.
31:	id.	7:	= a.
Sept. 2:	id.	26:	= b.
5:	2 steps > a.	Nov. 14:	= c.
7:	id.	23:	2 steps > d.
9:	id.	25:	id.
11:	id.	Dec. 9:	{in the middle be-
12:	id.		{tween e and g.

*W Pegasi.*<sup>1</sup>

Jan. 10:	W invisible.	Sept. 11:	1 step > e.
Sept. 2:	{in the middle be-	14:	= f.
5:	{tween d and e.	Oct. 7:	2 steps < g.
7:	2 steps > e.	Nov. 25:	utmost faint.
	1-2 steps > e.		

*SS Cygni.*<sup>1</sup>

Jan. 10,	6 <sup>h</sup> :	SS 3 steps > e.	Sept. 7, 9 <sup>h</sup> :	{< e.
Feb. 3,	7 <sup>h</sup> :	< g.		{> f.
Apr. 11, 12 <sup>h</sup> :		invisible.	11, 9 <sup>h</sup> :	1 step < f.
Aug. 31,	9 <sup>h</sup> :	2 steps < c.	Nov. 14, 10 <sup>h</sup> :	= g.
Sept. 2,	9 <sup>h</sup> :	id.	Dec. 9, 8 <sup>h</sup> :	< h.
Sept. 5,	9 <sup>h</sup> :	{in the middle,		
		{betw. d and e.		

*U Herculis.*<sup>1</sup>

Apr. 11:	{U in the middle be-	Sept. 11:	1 step < g.
	{tween a and b, b 2	14:	= h.
	{steps > c.	28:	id.
18:	1 step < a.	Oct. 3:	2 steps < h.
28:	id.	7:	3 steps < h.
Sept. 2:	= g.	29:	utmost faint.
5:	id.	Nov. 25:	invisible.
7:	id.		

*S Persei.*<sup>2</sup>

Apr. 11:	S = e.	Sept. 14:	{in the middle, be-
18:	= e.		{tween d and e.
Aug. 31:	1 step < d.	Oct. 26:	{< d.
Sept. 5:	= d.		{> e.
		Nov. 15:	= e.

<sup>1</sup> Vide the sketch in the *Publications A. S. P.*, No. 141, **24**, 109.<sup>1</sup> Vide the sketch in the *Publications A. S. P.*, No. 135, **23**, 42.<sup>2</sup> Vide the sketch in the *Publications A. S. P.*, No. 135, **23**, 43.

Var. 25, 1913, *Ursæ Majoris*.

(B. D. + 60° 1412 (9<sup>m</sup>.5) = f in the sketch on T *Ursæ Majoris*)

Jan. 10:	f 2 steps < g.	Sept. 12:	1 step > g.
Feb. 3:	= g.	14:	= g.
Mar. 22:	2 steps > g.	18:	1 step < g.
23:	> g.	28:	½ step > g.
31:	a little > g.	Oct. 3:	1 step < g.
Apr. 4:	1 step > g.	7:	1 step > g.
11:	id.	26:	id.
Aug. 31:	1 step < g.	Nov. 14:	= g.
Sept. 2:	id.	23:	> g.
5:	½ step > g.	25:	1 step > g.
7:	= g.	Dec. 9:	1 step < g.
11:	id.		

Several other stars have been watched, such as Y *Tauri*, which in this year have been noted > A = B. D. + 20° 1095, especially in March and April.

LARGE METEORS.

Fireballs have been observed from stations in Denmark and surrounding countries on the following dates: January 10th, 17th (five observations), 23rd, February 8th, 26th (two observations), 27th, March 22nd, 25th, 28th, April 16th, May 9th, 11th, 13th (seventeen observations), 24th (six observations), June 11th (two observations), 21st, 23rd, 25th (two observations), 30th, July 2nd, August 11th, September 7th, 9th, 16th (two observations), 19th (seven observations), October 8th (three observations), November 16th (two observations), December 12th, 16th, 20th, 30th.

SHOOTING-STARS.

Shooting-stars were observed at five stations in Denmark, one in Schleswig and one in Sweden from August 9th to 12th, furthermore at two stations in Denmark in the morning-hours on November 15th and 16th. At these stations 279 paths of shooting-stars were mapped, and 10 proved suitable for calculation. These 10 meteors have given the following results:—

## FROM OBSERVATION.

No.	Time, P. M.	Station.	Beginning.	Ending.	Mag.	Observer.
1	Aug. 11, 10 <sup>h</sup> 30 <sup>m</sup>	{ Tyderup Copenhagen	285°+46° 233 +25	..... .....	2 2	M. POVLSEN. S. KIERULFF.
2	Aug. 11, 10 42	{ Ulderup Copenhagen	..... .....	296°+11° 239 ÷ 9	3 3	A. BARTRAM. S. KIERULFF.
3	Aug. 12, 10 1	{ Varde Barsebäk	25 +48 190 +55.5	11 +47.5 204 +35	2 2	N. BOSSEN. W. NORLIND.
4	Aug. 12, 10 40	{ Varde Arlöse	19 +40 190 +62	8 +42 200.5 +36	5 2	N. BOSSEN. K. KAESTEL.
5	Aug. 12, 10 42	{ Ulderup Barsebäk	..... .....	49 +30.5 222 +24	3	A. BARTRAM. W. NORLIND.
6	Aug. 12, 11 18	{ Odder Tyderup	339 + 0 310 +10	357 ÷ 6 331 + 4	1 1	J. SKAKKE. M. POVLSEN.
7	Aug. 12, 11 27	{ Varde Tyderup	57 +47 148 +72	..... .....	3 1	N. BOSSEN. M. POVLSEN.
8	Aug. 12, 12 4	{ Varde Tyderup	..... .....	26 +13 330 +30	4 1-2	N. BOSSEN. M. POVLSEN.
9	Nov. 15, 16 32	{ Husby Tyderup	182 +33 30 +62	201 +44 0 +55.5	2 2	RASMUSSEN. M. POVLSEN.
10	Nov. 15, 16 42	{ Husby Tyderup	..... .....	212 +29 316 +64	2 2	RASMUSSEN. M. POVLSEN.

## FROM CALCULATION.

No.	Beginning.			Ending.			Real length of the path. $\beta$	Radiant. AR Decl.
	$h$	$\lambda$	$\phi$	$h$	$\lambda$	$\phi$		
1	55.0	1° 14'.4	55° 35'.7					
2				38.5	2° 52'.8	54° 39'.2		
3	134.4	1 32.4	56 43.0	107.3	2 16.8	56 11.3	80.7	53°+44°
4	96.7	2 4.6	56 4.3	67.0	2 58.8	55 48.6	70.4	33 +35
5				37.4	0 53.5	55 47.3		
6	75.6	1 3.2	54 59.0	37.6	0 44.2	55 15.7	53.5	257 +16
7	120.9	1 28.7	56 59.4					
8				84.6	0 54.5	55 19.3		
9	111.7	2 17.6	50 19.0	97.0	2 34.1	56 44.5	53.6	136 ÷14
10				37.7	1 25.7	56 35.8		

$h$  and  $\beta$  are expressed in kilometers;  $\lambda$  is west longitude from Copenhagen;  $\phi$  is north latitude;  $h$  is the altitude of the meteor above the Earth's surface.

The Carina-Meteor catalog has now reached the number of 6266 meteors, observed from stations in Denmark and surrounding countries from 1875 to 1915 inclusive.

From August 2nd to 7th, inclusive, astronomical lectures were held at the Carina Observatory in Odder.

In the estimation of variable stars I have been assisted by Mr. J. Skakke, who, also by the aid of a 78<sup>mm</sup> Darlot lens, has photographed several regions of the heavens.